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Amendment and Response

Applicant: Kirk Bresniker et al.

Serial No.: 09/923,976

Filed: August 7, 2001

Docket No.: 10012569-1

Title: SYSTEM AND METHOD FOR GRACEFUL SHUTDOWN OF HOST PROCESSOR CARDS IN A SERVER SYSTEM

REMARKS

This is responsive to the Final Office Action mailed October 4, 2006 and in support of the concurrently filed Request for Continued Examination. In that Office Action, the Examiner rejected claims 1, 2, 6, and 8 under 35 U.S.C. §102(e) as being anticipated by Mitchell et al., U.S. Patent No. 6,230,181 ("Mitchell"). Claims 3-5, 9, 11, 12, and 14-19 were rejected under 35 U.S.C. §103(a) as being unpatentable over Mitchell in view of Hamre et al., U.S. Patent No. 5,530,302 ("Hamre"). Claims 7, 10, 13, and 20 were rejected under 35 U.S.C. §103(a) as being unpatentable over Mitchell in view of Pignolet et al., U.S. Patent No. 6,023,148 ("Pignolet").

With this Response, claims 1 and 11 have been amended. Claims 1-20 remain pending in the application and are presented for reconsideration and allowance.

35 U.S.C. §102 Rejections

The Examiner rejected claims 1, 2, 6, and 8 under 35 U.S.C. §102(e) as being anticipated by Mitchell et al., U.S. Patent No. 6,230,181 ("Mitchell"). Amended independent claim 1 is directed to "a host processor card configured to be fitted into a server system", and recites "a processor", "a memory coupled to the processor for storing an operating system", and "a graceful shutdown circuit coupled to the processor and the power control line, the processor configured to automatically provide a graceful shutdown signal to the graceful shutdown circuit based on a status of the operating system, the graceful shutdown circuit configured to allow a graceful shutdown of the host processor card when the power control line indicates that the host processor card is to be powered down if the processor has provided the graceful shutdown signal."

In the Office Action mailed March 2, 2006, the Examiner identified the gateway card 50 disclosed in Mitchell as corresponding to the host processor card recited in claim 1, and identified shutdown management driver 62 as corresponding to the processor recited in claim 1. (Office Action mailed 3/2/06 at para. no. 3, page 3). As shown in Figure 3 of Mitchell, shutdown management driver 62 is separate from the gateway card 50. Mitchell discloses that the shutdown management driver 62 is located on a management card, not on the gateway card 50. (Mitchell at col. 6, lines 26-27). Thus, Mitchell does not teach or suggest a

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host processor card that comprises a processor that is configured to provide a graceful shutdown signal to a graceful shutdown circuit of the host processor card, as recited in claim 1.

In the Final Office Action mailed October 4, 2006, the Examiner stated the following:

As per remarks, Applicants' argued that (1) Mitchell does not teach or suggest a host processor card that comprises a processor that is configured to provide a graceful shutdown signal to a graceful shutdown circuit of the host processor card, as recited in claim 1.

As to point (1), Mitchell discloses a host processor card configured to be fitted into a server system [i.e. a gateway card 50 in the embedded system 10] [50, Figures 2 and 3; col. 4, lines 66 – col. 5, lines 2; and col. 5, lines 19-40], a processor [i.e. the gateway card includes a debounce circuit 36] [36, Figure 3; and col. 5, lines 28-30], a graceful shutdown circuit coupled to the processor and the power control line [i.e. the reset signal at 37 feeds into the shutdown and reset manager 60] [60, Figure 3; and col. 5, lines 34-44], the graceful shutdown circuit configured to allow a graceful shutdown of the host processor card when the power control line indicates that the host processor card is to be powered down if the processor has provided the graceful shutdown signal [i.e. when the reset signal 37 is asserted, the shutdown and reset manager 60 generates an interrupt signal in the INT input of the microprocessor 56, the shutdown of the operating system is initiated] [col. 5, lines 41-55]. (Final Office Action at para. nos. 3-4, pages 2-3).

As shown above, the Examiner initially identified the shutdown management driver 62 disclosed in Mitchell as corresponding to the processor recited in claim 1, but now argues in the Final Office Action that the debounce circuit 36 corresponds to the processor recited in claim 1. A debounce circuit is not a "processor" as that term is used in the present Application, and as that term is understood in the art. The debounce circuit 36 is not coupled to a memory (i.e., claim 1 recites "a memory coupled to the processor for storing an operating system). The debounce circuit 36 also does not satisfy the limitations of some of the dependent claims, such as dependent claim 6, which recites "wherein the processor includes a register for indicating when a graceful shutdown is to be performed, and wherein the operating system is configured to write a value to the register indicating whether a graceful shutdown is to be performed". There is no teaching or suggestion in Mitchell that the debounce circuit 36 includes a register. Dependent claim 8 recites that the processor is coupled to a monitor circuit, and recites "the monitor circuit configured to provide an

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indication of the status of the power control line to the processor". There is no teaching or suggestion in Mitchell that the debounce circuit 36 is coupled to a monitor circuit.

In addition, amended independent claim 1 recites "the processor configured to automatically provide a graceful shutdown signal to the graceful shutdown circuit based on a status of the operating system". There is no teaching or suggestion in Mitchell that the debounce circuit 36 automatically provides a graceful shutdown signal to a graceful shutdown circuit based on a status of an operating system.

In view of the above, Mitchell does not teach or suggest each and every limitation of independent claim 1. Applicant respectfully requests removal of the rejection of claim 1 under 35 U.S.C. § 102(e), and requests allowance of this claim. Since dependent claims 2, 6, and 8 further limit patentably distinct claim 1, claims 2, 6, and 8 are believed to be allowable over the cited reference, and allowance of claims 2, 6, and 8 is respectfully requested.

35 U.S.C. §103 Rejections

Claims 3-5, 9, 11, 12, and 14-19 were rejected under 35 U.S.C. §103(a) as being unpatentable over Mitchell in view of Hamre et al., U.S. Patent No. 5,530,302 ("Hamre").

Dependent claims 3-5 and 9 further limit patentably distinct claim 1, and are believed to be allowable over the cited references. Allowance of claims 3-5 and 9 is respectfully requested.

Amended independent claim 11 is directed to "a graceful shutdown circuit for a host processor card configured to be fitted into a server system" and recites "a monitor circuit for monitoring the state of the power control line, the monitor circuit including a first output configured to be coupled to a processor of the host processor card to indicate the state of the power control line", "a first input configured to be coupled to a processor of the host processor card, the first input indicating whether a graceful shutdown is to be performed" and "a switch circuit coupled to the first input and the power control line, the switch circuit configured to override a power down signal on the power control line and thereby maintain power to the host processor card via the power control line when the first input indicates that a graceful shutdown is to be performed."

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With respect to independent claim 11, the Examiner stated that "[a]s per claim 11, it is rejected for similar reasons as stated above in claims 1, 8, and 9." (Final Office Action at para. no. 18, page 7). With respect to claim 1, the Examiner identified the gateway card 50 disclosed in Mitchell as corresponding to the host processor card recited in claim 1, identified the debounce circuit 36 as corresponding to the processor recited in claim 1, and identified the shutdown and reset manager 60 as corresponding to the graceful shutdown circuit recited in claim 1. (Final Office Action at para. no. 9, page 4). Independent claim 11 recites "the monitor circuit including a first output configured to be coupled to a processor of the host processor card to indicate the state of the power control line." There is no teaching or suggestion in Mitchell that shutdown and reset manager 60 (which the Examiner identified as corresponding to the graceful shutdown circuit in claim 1) includes a monitor circuit with an output configured to be coupled to the debounce circuit 36 (which the Examiner identified as corresponding to the processor recited in claim 1).

In addition, with respect to claim 9, the Examiner stated that:

As per claim 9, Mitchell does not specifically disclose a switch circuit coupled to the power control line and coupled to the processor, the switch circuit configured to override a power down signal on the power control line and thereby maintain power to the host processor card if the processor has provided the graceful signal to the graceful shutdown circuit. Hamre discloses a switch circuit coupled to the power control line and coupled to the processor, the switch circuit configured to override a power down signal on the power control line and thereby maintain power to the host processor card if the processor has provided the graceful signal to the graceful shutdown circuit [i.e. gracefully or gradually removing power] [Abstract; and col. 3, lines 5-19]. (Final Office Action at para. no. 18, page 7).

Applicant respectfully disagrees with the Examiner's contention that Hamre discloses a switch circuit coupled to a processor and configured to override a power down signal on the power control line and thereby maintain power to the host processor card if the processor has provided the graceful shutdown signal to the graceful shutdown circuit, as recited in dependent claim 9. There is no teaching or suggestion in the above-cited portions of Hamre that the disclosed circuit board even includes a processor. Hamre does not teach or suggest that the disclosed circuit board includes a switch circuit coupled to a processor, let alone that the switch circuit is also configured to override a power down signal on a power control line

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"if the processor has provided the graceful shutdown signal", as recited in dependent claim 9. Similarly, Hamre does not teach or suggest "a switch circuit coupled to the first input and the power control line, the switch circuit configured to override a power down signal on the power control line and thereby maintain power to the host processor card via the power control line when the first input indicates that a graceful shutdown is to be performed", as recited in independent claim 11.

In the Final Office Action, the Examiner stated the following:

As per remarks, Applicants' argued that (2) Hamre does not teach or suggest "a switch circuit coupled to the power control line and coupled to the processor, the switch circuit configured to override a power down signal on the power control line and thereby maintain power to the host processor card if the processor has provided the graceful shutdown signal to the graceful shutdown circuit" as recited in independent claim 9.

As to point (2), it is rejected for similar reasons as stated in the previous Office Action. Furthermore, Hamre discloses switch S1 and the circuitry that gracefully applies power to or removes power from the circuit board power busses [Figure 7; col. 7, lines 33-48; and col. 8, lines 13-35]. (Final Office Action at para. nos. 5-6, page 3).

Switch S1, which was identified above by the Examiner, is a pushbutton switch. (Hamre at Figures 6 and 7, and col. 7, line 9). There is no teaching or suggestion in the above-cited portions of Hamre that the pushbutton switch 31 is coupled to a processor, or that the pushbutton switch 31 is configured to override a power down signal on a power control line when the processor indicates that a graceful shutdown is to be performed, as recited in independent claim 11. There is no teaching or suggestion in the above-cited portions of Hamre that the disclosed circuit board even includes a processor.

In view of the above, Mitchell and Hamre do not teach or suggest each and every limitation of independent claim 11. Applicant respectfully requests removal of the rejection of claim 11 under 35 U.S.C. § 103(a), and requests allowance of this claim. Since dependent claim 12 further limits patentably distinct claim 11, claim 12 is believed to be allowable over the cited references, and allowance of claim 12 is respectfully requested.

Independent claim 14 is directed to "a method of gracefully shutting down a host processor card in a server system", and recites "providing a graceful shutdown indication

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from an operating system of the host processor card to a processor of the host processor card when an immediate shutdown of the host processor card should not be performed" and "outputting a graceful shutdown signal from the processor when an immediate shutdown of the host processor card should not be performed." With respect to independent claim 14, the Examiner stated that "[a]s per claim 14, it is rejected for similar reasons as stated above in claims 1, 8, and 9." (Final Office Action at para. no. 21, page 8). In the rejection of claims 1, 8, and 9, the Examiner did not identify any disclosure in Mitchell or Hamre that teaches or suggests "providing a graceful shutdown indication from an operating system of the host processor card to a processor of the host processor card when an immediate shutdown of the host processor card should not be performed", as recited in independent claim 14. Applicant pointed out this lack of teaching or suggestion in the Response to the Office Action mailed March 2, 2006, but this issue was not addressed in the Final Office Action mailed October 4, 2006. The Examiner has not identified any disclosure in Mitchell or Hamre that teaches or suggests "providing a graceful shutdown indication from an operating system of the host processor card to a processor of the host processor card when an immediate shutdown of the host processor card should not be performed", as recited in independent claim 14. In addition, Mitchell and Hamre do not teach or suggest other limitations of independent claim 14, for the reasons discussed above with respect to independent claims 1 and 11.

In view of the above, Mitchell and Hamre do not teach or suggest each and every limitation of independent claim 14. Applicant respectfully requests removal of the rejection of claim 14 under 35 U.S.C. § 103(a), and requests allowance of this claim. Since dependent claims 15-19 further limit patentably distinct claim 14, claims 15-19 are believed to be allowable over the cited references, and allowance of claims 15-19 is respectfully requested.

Claims 7, 10, 13, and 20 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Mitchell in view of Pignolet et al., U.S. Patent No. 6,023,148 ("Pignolet"). Dependent claims 7, 10, 13, and 20 further limit patentably distinct claim 1, 11, or 14, and are believed to be allowable over the cited references. These dependent claims are also further distinguishable over the cited references. For example, there is no disclosure in the portions of Pignolet cited by the Examiner with respect to claim 7 that teaches or suggests "wherein the operating system is configured to write a value to the register indicating that a graceful

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shutdown is to be performed when the operating system boots up to a point that an immediate shutdown should not be performed." Allowance of claims 7, 10, 13, and 20 is respectfully requested.

CONCLUSION

In view of the above, Applicant respectfully submits that pending claims 1-20 are in form for allowance and are not taught or suggested by the cited references. Therefore, reconsideration and withdrawal of the rejections and allowance of claims 1-20 is respectfully requested.

No fees are required under 37 C.F.R. 1.16(h)(i). However, if such fees are required, the Patent Office is hereby authorized to charge Deposit Account No. 08-2025.

The Examiner is invited to contact the Applicant's representative at the below-listed telephone numbers to facilitate prosecution of this application.

Any inquiry regarding this Response should be directed to either David A. Plettner at Telephone No. (408) 447-3013, Facsimile No. (408) 447-0854 or Jeff A. Holmen at Telephone No. (612) 573-0178, Facsimile No. (612) 573-2005. In addition, all correspondence should continue to be directed to the following address:

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Respectfully submitted,

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CERTIFICATE UNDER 37 C.F.R. 1.8:

The undersigned hereby certifies that this paper or papers, as described herein, are being facsimile transmitted to the United States Patent and Trademark Office, Fax No. (571) 273-8300 on this 15 day of November, 2006.

By: Jeff A. Holmen

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